

essentially Fe. A total amount of Ti, Nb, Zr, V and/or W carbide precipitates distributed in the steel matrix is adjusted to 0.1 wt.% or more. The steel achieves excellent abrasion resistance by the dispersion of carbide precipitates. These carbides have nearly the same hardness as other hard particles, such as alumina and silicon carbides, which cause abrasive abrasion. Due to such excellent abrasion resistance, a weaving machine member, a sewing needle, an agricultural machine member such as a mowing tooth or a cutter blade made of the steel can be used over a long period.

A3

REMARKS

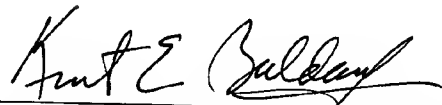
This application is a divisional of co-pending U.S. patent application Serial No. 09/471,957, filed December 23, 1999 (the "parent application"). The parent application has been allowed.

The original specification has been amended herein to incorporate the numerous changes made during prosecution of the parent application and other minor grammatical errors. For the Examiner's convenience, a substitute specification is submitted herewith. No new matter has been added. Three specifications are enclosed: the original specification from the parent application; a substitute specification with revision marks showing additions and deletions; and a clean substitute specification with the revisions incorporated therein. Entry of the substitute specification is respectfully requested.

Respectfully submitted,

WEBB ZIESENHEIM LOGSDON
ORKIN & HANSON, P.C.

By



Kent E. Baldauf, Registration No. 25,826
Attorney for Applicants
700 Koppers Building, 436 Seventh Avenue
Pittsburgh, Pennsylvania 15219-1818
Telephone: 412-471-8815
Facsimile: 412-471-4094

Marked-Up Version of Changes Made

IN THE CLAIMS:

Claim 1 has been amended as follows:

1. A steel excellent in abrasion resistance [essentially] consisting essentially of 8.0-35.0 wt.% Cr, 0.05-1.20 wt.% C, 0.05-3.0 wt.% at least one of Ti, Nb, Zr, V and W, [and] the balance being essentially Fe and having the structure that a total amount of Ti, Nb, Zr, V and/or W carbide [precipitations] precipitates distributed in a steel matrix is adjusted to 0.1 wt.% or more.

Claim 2 has been canceled.

New claim 3 has been added:

3. An abrasion-resistant steel consisting essentially of:

8.0 to 35.0 wt.% Cr;

0.05 to 1.20 wt.% C;

at least one of 0.05 to 1 wt.% Ti and 0.05 to 1.50 wt.% Nb wherein an aggregate of Ti + Nb is 0.50 to 2.0 wt.%;

optionally one or more metals selected from the group consisting of Zr, Al and W in an aggregate summed with Ti + Nb up to 3.0 wt.%;

further optionally one or more of 0.2-5.0 wt.% Ni, 0.1-3.0 wt.% Mo and 0.2-3.0 wt.% Cu; and

with the balance being essentially Fe,

wherein said Ti, Nb, Zr, V and/or W are present in the form of carbide precipitates distributed within a steel matrix in an amount of at least 0.1 wt.%.

BEST AVAILABLE COPY

IN THE ABSTRACT:

The Abstract has been amended as follows:

[A newly proposed steel consists] An abrasion resistant steel consisting essentially of 8.0-35.0 wt.% Cr, 0.05-1.20 wt.% C, 0.05-3.0 wt.% at least one of Ti, Nb, Zr, V and W and the balance being essentially Fe. [and has the structure that a] A total amount of Ti, Nb, Zr, V and/or W carbide [precipitations] precipitates distributed in [a] the steel matrix is adjusted to 0.1 wt.% or more. The steel [is bestowed with] achieves excellent abrasion resistance by [distribution] the dispersion of carbide [precipitations] precipitates. These carbides have nearly the same hardness as other hard particles, such as alumina and silicon carbides, which [causes] cause abrasive abrasion. Due to such excellent abrasion resistance, a weaving machine member, a sewing needle, an agricultural machine member such as a mowing tooth or a cutter blade made of the steel can be used over a long period.

BEST AVAILABLE COPY